7.0 COMPARISON OF ALTERNATIVES AND OTHER NEPA CONSIDERATIONS

7.1 INTRODUCTION

This chapter compares the alternatives and their environmental consequences for the NorthMet Project Proposed Action and Land Exchange Proposed Action. It also addresses irretrievable and irreversible effects, short-term uses verses long-term productivity of the environment, and unavoidable adverse effects. The chapter concludes with a statement on the Co-lead Agencies' preferred alternative.

7.2 COMPARISON OF ALTERNATIVES

Alternatives to the NorthMet Project Proposed Action and Land Exchange Proposed Action were screened and analyzed relatively independently of each other because of the different nature of the actions. This section consolidates the connected actions, and summarizes the detailed analysis presented in the respective sections in Chapter 5 and 6. A description of the connected alternatives is provided below, followed by a comparison of the environmental consequences.

7.2.1 Proposed Connected Actions

The Proposed Connected Actions would involve both the NorthMet Project Proposed Action and Land Exchange Proposed Action as presented and described in Sections 3.2.2 and 3.3.2, respectively.

The NorthMet Project Proposed Action would involve three major components: a new copper-nickel-PGE Mine Site, a refurbished Plant Site at the former LTVSMC processing plant, and an existing Transportation and Utility Corridor that would connect the Mine Site and Plant Site. The NorthMet Project Proposed Action would comprise three phases. The first phase would last for approximately 18 months and would include site preparation, refurbishment of some existing buildings, and construction of new facilities and infrastructure. The second phase, which would last approximately 20 years, would include operation of the mine and processing facilities; blasting, hauling, and processing of the ore to be shipped; stockpiling of waste rock; and progressive reclamation (at the same time as mining). The third phase would occur after mining and would include infrastructure removal and final land reclamation, and post-closure maintenance. Post-closure maintenance would involve ongoing, long-term site maintenance, water monitoring, and mechanical and non-mechanical treatment of water for as long as necessary to meet regulatory standards at evaluation locations in groundwater and surface water. Both mechanical and non-mechanical treatment would require periodic maintenance and monitoring activities. Mechanical water treatment is part of the modeled NorthMet Project Proposed Action for the duration of the simulations (200 years at the Mine Site and 500 years at the Plant Site). The duration of the simulations was determined based on capturing the highest predicted concentrations of the modeled NorthMet Project Proposed Action. It is uncertain how long the NorthMet Project Proposed Action would require water treatment, but it is expected to be long term; actual treatment requirements would be based on measured, rather than modeled, NorthMet Project water quality performance, as determined through monitoring requirements.

PolyMet would be held accountable to maintenance and monitoring required under permit and would not be released until all conditions have been met.

The configuration of the NorthMet Project Proposed Action is shown in Figure 3.2-1 in Section 3.2.1. The development of the Mine Site is shown in Figures 3.2-4 through 3.2-9 in Section 3.2.2.1. The Transportation and Utility Corridor is shown in Figure 3.2-20 in Section 3.2.2.2, and development of the Plant Site is shown in Figure 3.2-23 and Figure 3.2-29 in Section 3.2.2.3.

The Land Exchange Proposed Action would involve exchange of a single 6,650.2-acre (GLO) tract of federal land (encompassing the activities proposed at the Mine Site) with up to 6,722.5 acres (GLO) of privately owned, non-federal lands located within five different tracts throughout the proclamation boundary of the Superior National Forest within St. Louis, Lake, and Cook counties of northeastern Minnesota. The location of the federal and non-federal lands is shown in Figure 3.3-1 in Section 3.3.2.

7.2.2 Proposed Connected Actions Alternative B

Proposed Connected Actions Alternative B would involve the NorthMet Project Proposed Action as described in Section 3.2.2 and summarized above in Section 7.2.1, and the Land Exchange Alternative B as described in Section 3.3.3.2.

Compared to the Land Exchange Proposed Action, the Land Exchange Alternative B would involve conveying fewer acres of federal lands, approximately 4,900.7 acres (GLO), for fewer acres of non-federal land, approximately 4,651.5 acres (GLO) from a single tract (Tract 1). The configuration of the smaller federal parcel is shown in Figure 3.3-2 in Section 3.3.3.2.

7.2.3 No Action Alternative

Under the No Action Alternative there would be no NorthMet Project Proposed Action or Land Exchange Proposed Action. Refer to Section 3.2.3.2 and Section 3.3.3.1 for a discussion on the No Action alternative for the respective connected actions.

At the Mine Site, PolyMet would be required under exploration approvals to reclaim surface disturbance associated with exploratory and development drilling activities. Other existing surface uses would be allowed to continue consistent with the Superior National Forest Plan. No further upgrades or new segments would be constructed along the existing power transmission line, railroad, and Dunka Road, which would continue to be used by their private owners. At the former LTVSMC processing plant and Tailings Basin, the land owner, Cliffs Erie, would be required to complete closure and reclamation activities as required under existing state permits, plans, and the Consent Decree.

The federal government would not convey federal lands to PolyMet and the USFS would continue managing these lands as has been done in the past. Furthermore, the federal government would not acquire the five tracts of non-federal lands and the lands would remain as private lands.

7.2.4 Comparison of Effects

A summarized comparison of the environmental consequences of the alternatives—as described in Sections 7.2.1, 7.2.2, and 7.2.3—is provided in Table 7.2-1. Refer to the respective sections in Chapter 4 for discussion on the affected environment and to Chapter 5 for more detail on the environmental consequences.

In comparison to the Proposed Connected Actions (see Section 7.2.1), the Proposed Connected Actions Alternative B (see Section 7.2.2) would have the same effects from the NorthMet Project Proposed Action, but would convey fewer lands through the Land Exchange, resulting in smaller net increases/decreases in environmental resources. The No Action Alternative would not directly affect the existing environment and management of these lands would continue in accordance with their current permits. Compared to the Proposed Connected Actions and Proposed Connected Actions Alternative B, the No Action Alternative would likely result in active but different comprehensive management of water from the existing LTVSMC Tailings Basin. There would be no other measurable effect on other resources compared to their existing conditions.

Table 7.2-1 Comparison of Environmental Consequences by Alternative

Resource	Proposed Connected Actions	Proposed Connected Actions Alternative B	No Action Alternative
Land Use	• No effects on land use that would require changes in ordinances or comprehensive forest plans • Federal lands within the NorthMet Project area would be replaced with acreage of equal value through a land exchange	• Mostly similar effects as Proposed Connected Actions, with fewer federal acres exchanged	• Existing LTVSMC site would be reclaimed in accordance with the reclamation/closure plan
Water Resources	• Greater than 90% of water would be captured and treated to a concentration at or below applicable water quality evaluation criteria • The NorthMet Project Proposed Action would not directly cause or increase the magnitude of an exceedance of the groundwater and surface water quality evaluation criteria, although a project side effect would cause exceedances of aluminum and lead evaluation criteria in tributary streams north of Tailings Basin • Mercury loadings to the Embarrass River would increase slightly, decrease slightly to the Partridge River, with an overall net decrease in NorthMet Project Proposed Action loadings to the downstream St. Louis River. Discharges from the Plant Site WWTP and Mine Site WWTF would be at or below the Great Lakes Initiative discharge standard of 1.3 ng/L • Sulfate concentrations would remain unchanged in the Partridge River and would be significantly reduced in the	• Same as under Proposed Connected Actions	• Seepage water quality from the existing LTVSMC Tailings Basin would be expected to improve over time as a result of the Cliffs Erie Consent Decree, other permit requirements (e.g., Permit to Mine), and natural attenuation of contaminants

Resource	Proposed Connected Actions	Proposed Connected Actions Alternative B	No Action Alternative
	Embarrass River • Plant Site WWTP effluent and Colby Lake water would be used to augment flows to tributary streams and wetlands downgradient from the Tailings Basin to offset groundwater seepage captured in the containment system for water quality reasons		
Wetlands and Floodplains	• 912.5 acres of wetlands in NorthMet Project area would be directly affected • 6,498.1 to 7,350.7 acres of wetlands in NorthMet Project area would be indirectly affected • 939.4 acres of directly affected and fragmented wetlands to be mitigated up front • 1,631.4 acres of compensatory off-site wetlands • 505.5-acre net increase of wetlands to the federal estate (through Land Exchange Proposed Action); therefore, Land Exchange Proposed Action conforms to EO 11990 • 1,401.0-acre net decrease of floodplains to the federal estate (through Land Exchange Proposed Action); however, no decrease in regulatory floodplains, no increase in flood damage potential, and no change in ecological function of floodplain. Therefore, Land Exchange Proposed Action conforms to EO 11988 • Wetland mitigation plan would be implemented to offset increased carbon dioxide emissions to extent practicable	• Same direct and indirect effects and compensatory mitigation at NorthMet Project area as under Proposed Connected Actions • 69.9-acre net increase of wetlands to the federal estate (through Land Exchange Alternative B); therefore, Land Exchange Alternative B conforms to EO 11990 • 1,036.7-acre net decrease of floodplains to the federal estate (through Land Exchange Alternative B); however, no decrease in regulatory floodplains, no increase in flood damage potential, and no change in ecological function of floodplain. Therefore, Land Exchange Alternative B conforms to EO 11988	• No change in wetland or floodplain acreage

Resource	Proposed Connected Actions	Proposed Connected Actions Alternative B	No Action Alternative
Vegetation (includes habitat and Special Status Species)	• 4,016.3-acre decrease in vegetation in the NorthMet Project area • Special concern plant species: nine directly affected, two indirectly affected in the NorthMet Project area • 579.6-acre net increase of vegetation land cover types to federal estate (through Land Exchange Proposed Action) • Decrease of 11 plant species, increase of two different plant species to the federal estate (through Land Exchange Proposed Action)	• Same decrease of vegetation in NorthMet Project area as under Proposed Connected Actions • Same effects on plant species in the NorthMet Project area as under Proposed Connected Actions • 173.6-acre net increase of vegetation land cover types to the federal estate (through Land Exchange Alternative B)	• No effects on vegetation
Wildlife (includes Special Status Species)	• 4,016.3-acre decrease of wildlife habitat in the NorthMet Project area • Localized population decrease and fragmentation of critical habitat of the Canada lynx • Low potential for incidental take resulting from vehicular collisions due to increased NorthMet Project Proposed Action-related traffic • Special status species, including SGCN, RFSS, and other wildlife species (such as those considered tribally or culturally significant) may be affected by human activity, noise and vibration, rail and vehicle traffic, and decrease of habitat • Wildlife corridors at and adjacent to the NorthMet Project area would be affected through the reduction of access to these corridors • 579.6-acre net increase of vegetation land cover types for wildlife habitat to	• Same as under Proposed Connected Actions at the NorthMet Project area • 173.6-acre net increase of vegetation land cover types for wildlife habitat to the federal estate (through Land Exchange Alternative B)	• No effects on wildlife

Resource	Proposed Connected Actions	Proposed Connected Actions Alternative B	No Action Alternative
	the federal estate (through Land Exchange Proposed Action)		
Aquatic Species	• No effects from changes in stream flow, which would remain within natural variability • No decrease in the Riparian Connectivity Index • Would not directly exceed or increase existing exceedances of Class 2B water quality standards, with the exception of aluminum and lead that is not attributable to process water from the NorthMet Project Proposed Action (i.e., is attributable to non-contact stormwater runoff and Colby Lake water) • No effect on federally or state-listed aquatic species	• Same as under Proposed Connected Actions	• Water seepage from the existing LTVSMC site would be managed in accordance with the Cliffs Erie Consent Decree
Air Quality (includes Greenhouse Gases and Global Climate Change)	• Increased emissions of criteria air pollutants, but below Prevention of Significant Deterioration major source thresholds • Amphibole mineral fiber emissions minimized by installing best available particulate emission control equipment and preventing fugitive dust generation • The air quality of the BWCAW would not be adversely affected by the NorthMet Project Proposed Action	• Same as under Proposed Connected Actions	• Continued air (fugitive dust) effects at LTVSMC site until remediation occurs under closure/reclamation plan
Noise and Vibration	• Added noise emissions and vibration. However, in all cases, the NorthMet Project Proposed Action, during the operations phase, would comply with the applicable state standards • Noise, ground vibration, and air blast	• Same as under Proposed Connected Actions	• No effects

Resource	Proposed Connected Actions	Proposed Connected Actions Alternative B	No Action Alternative
	impact area/zone would be limited to 11,456, 11,334, and 11,469 acres, respectively. The BWCAW, which is 20 miles away, is outside the maximum area of audibility (247,612 acres)		
Cultural Resources & Historic Properties	• Adverse effects on the *Mesabe Widjiu* (Laurentian Divide) • Effects, but no adverse effects, on Sugarbush • Adverse effects on the Beaver Bay to Lake Vermilion Trail • Adverse effects on Erie Mining Company Concentrator Building • Effects, but no adverse effects, on Erie Mining Company Railroad Mine and Plant Track • Potential to affect 1854 Treaty resources	• Same as under Proposed Connected Actions	• No effects
Socioeconomics (includes Environmental Justice)	• Up to 500 new direct jobs (maximum during construction), plus additional indirect and induced jobs • Millions of dollars revenue for State of Minnesota and federal taxes • Environmental Justice (Native American) populations affected by changes in subsistence uses and potential increased living costs	• Same as under Proposed Connected Actions	• No effects
Recreation and Visual Resources	• Net increase to the federal estate of recreational land on acquired tracts through Land Exchange Proposed Action • Visual effects would occur, but would not exceed USFS standards	• Fewer federal lands conveyed at NorthMet Project Mine Site under Land Exchange Alternative B • Remaining federal lands at Mine Site would not have public access • Fewer acres acquired through Land Exchange Alternative B	• No effects

Resource	Proposed Connected Actions	Proposed Connected Actions Alternative B	No Action Alternative
		• Same visual resources effects as under Proposed Connected Actions	
Wilderness and Special Designation Areas	• No effects on Wilderness or Special Designation Areas • The air quality of the BWCAW would not be adversely affected by the NorthMet Project Proposed Action	• Same as under Proposed Connected Actions	• No effects
Hazardous Materials	• Potential effects from spills and use of explosives during operations	• Same as under Proposed Connected Actions	• No effects
Geotechnical Stability	• Waste rock stockpiles, Tailings Basin, and Hydrometallurgical Residue Facility would be constructed in accordance with applicable State of Minnesota standards • Monitoring and adaptive management would maintain geotechnical stability	• Same as under Proposed Connected Actions	• Tailings Basin would be subject to closure and reclamation activities in accordance with MDNR requirements

7.3 OTHER NEPA CONSIDERATIONS

In addition to disclosure of direct, indirect, and cumulative effects, NEPA requires that federal agencies identify whether, and to what extent, the proposed action causes irreversible or irretrievable commitments of resources and considers the short-term use of the environment versus maintenance and enhancement of long-term productivity (40 CFR 1502.16). Each of these considerations is explained and disclosed below and the resultant unavoidable adverse effects are described above in Section 7.2.4.

7.3.1 Irreversible or Irretrievable Commitment of Resources

Irreversible commitments of resources are those that involve permanent loss because the affected resource cannot be returned to its previous condition (e.g., mined ore or wetlands that would be permanently converted to rock stockpile). Irretrievable commitments of resources are more temporary in nature because the environment can be returned to its previous state through reclamation and restoration activities (e.g., wetlands that would be restored or former facilities that would be removed and the land recontoured and replanted per the reclamation plan).

The construction and operation of the NorthMet Project Proposed Action would result in the irreversible loss of approximately 225 million tons of base and precious metal ore. Mining activities would remove 912.5 acres of wetlands that would be permanently lost. Through on-site restoration and off-site compensatory mitigation, these would be eventually replaced by the restoration of 101.8 acres and 1,631.4 acres of wetlands, respectively. The reclamation of on-site wetlands would be considered an irretrievable commitment since it would restore wetlands temporarily lost through mining activities.

Other resources could also be irreversibly lost by the NorthMet Project Proposed Action. For example, changes in the viewshed from the expansion of the existing LTVSMC Tailings Basin would permanently alter visual resources. While cultural resources may be adversely affected, irreversible commitments would be minimized through avoidance. There would be both irreversible and irretrievable loss of federally managed wildlife habitat under the NorthMet Project Proposed Action and Land Exchange Proposed Action. Some species, such as white-tailed deer, may not avoid the area throughout the mine life, although some habitat would be disturbed. Others, such as the Canada lynx, may seek other, better habitat elsewhere. Air quality effects, primarily from fugitive dust, would occur during the mine life, but air quality would return to pre-mining conditions after closure and rehabilitation and restoration of disturbed areas. Water quality would be affected as discussed in Section 5.2.2. These would be considered irretrievable commitments due to their temporary nature.

The federal lands may contain natural resources culturally important to tribal entities, including access to the land itself, which would be irreversibly lost following the Land Exchange Proposed Action and conversion of the land from public to private ownership.

7.3.2 Short-Term Uses versus Long-Term Productivity of the Environment

NEPA requires that agencies disclose how the short-term use of land or a resource may affect its long-term productivity. For example, the NorthMet Project Proposed Action and Land Exchange Proposed Action would utilize existing federal resources (i.e., at the Mine Site), which would no longer be available for other purposes, such as timber harvesting or wildlife habitat. The long-term loss of the productivity of the land for these purposes would constitute a foregone opportunity.

The construction and operation of the NorthMet Project Proposed Action would cause short-term effects on air, noise, and visual resources during the 20-year life of the mine. Additionally, there may be potential short-term effects on wetlands from time delays between the loss of existing wetland resources (at the NorthMet Project area) and the development of new, viable wetlands with similar functions (at the off-site wetland mitigation areas). During construction and operation of the mine, air pollutant concentrations would be higher throughout the study area than they are currently, but below applicable air quality standards. Once mining and reclamation are completed, the pollutant concentrations would return to pre-mining levels. The noise levels in the area, while below standards, would increase during operation of the mine. However, post-closure, the noise levels would return to pre-mining levels. The visual effects from the NorthMet Project Proposed Action would be most noticeable during year 11, when the Category 2/3 Stockpile and Category 4 Stockpile would be at their maximum heights (after which time they would be placed into the East Pit as backfill), and year 12, when the Category 1 Stockpile would reach its maximum height. Additionally, there would be short-term effects on visual resources from fugitive dust and night-lighting during operations. Long-term visual effects would be landform changes as a result of mining activities.

The Land Exchange Proposed Action would result in the permanent loss of the federal lands for mining purposes, which would be offset by the long-term increased productivity of the non-federal lands as they would be managed under the Forest Plan. As a result of the Land Exchange Proposed Action, there would be no effects as a result of short-term use of aquatic species, cultural resources, vegetation, wildlife, water resources, air resources, wetlands, or recreational and visual resources.

The NorthMet Project Proposed Action and Land Exchange Proposed Action would remove 6,650.2 acres (GLO) at the Mine Site from Forest Service administration and management under the Forest Plan. Currently, the federal lands, which include the Mine Site, are managed under the Forest Plan as General Forest – Longer Rotation (6,140.1 acres) and as General Forest (355.3 acres). If the land were exchanged, the long-term productivity of the federal lands at the Mine Site would be lost to timber production and other forest uses for the short-term use as a mine. This would represent an unquantified opportunity cost in which the lands and resources could not be used for forest purposes. The Proposed Connected Actions Alternative B would result in 4,397.3 acres lost under General Forest – Longer Rotation management and 355.3 acres under the General Forest management category. These losses would be replaced by the acquisition, through the Land Exchange Proposed Action, of land for Forest purposes.

7.3.3 Unavoidable Adverse Effects

Regardless of the inclusion of all reasonable mitigation, some effects may not be avoided. For example, the NorthMet Project Proposed Action would utilize technologies to mitigate effects on water quality, which have been demonstrated through modeling to meet applicable water quality evaluation criteria (with two exceptions, refer to Section 5.2.2). However, effects on water quality would remain after all reasonable mitigation measures have been applied.

After the implementation of mitigation measures that have been built into the design, the NorthMet Project Proposed Action would have unavoidable adverse effects on wetlands, vegetation, wildlife, air quality, noise and vibration, visual resources, cultural resources, water resources, and aquatic species. Unavoidable direct effects on surface features such as wetlands, vegetation, and wildlife resources would be offset by gains through off-site mitigation (wetlands) and through lands acquired through the Land Exchange Proposed Action. Unavoidable noise and vibration, air, and water emissions from the NorthMet Project Proposed Action would affect the existing conditions, but would not trigger new exceedances of relevant water quality evaluation criteria (with two exceptions, refer to Section 5.2.2) and would result in comparatively small increases to existing levels. The residual practical effects of the Land Exchange Proposed Action would be the loss of federal land, which would be used for the NorthMet Project Proposed Action, and the gain of non-federal lands.

7.4 PREFERRED ALTERNATIVE

Consistent with the CEQ regulations, the federal Co-lead Agencies are required to identify an agency-preferred alternative in a DEIS, if one exists, and in the FEIS unless another law prohibits the expression of such a preference. At this time, the Co-lead Agencies have not identified a preferred alternative, and for the USACE, Appendix B of 33 CFR Part 325 supersedes the CEQ requirement to identify an agency-preferred alternative.

No similar requirement to identify a preferred alternative exists for the MDNR under state law.